# Benchmark Dose Modeling

***Risk Assessment Services***

Demonstrating product safety is an important factor in obtaining international regulatory authorities' approval for marketing technical grade active ingredients, manufacturing-use products, and end-use products. Over the years, a variety of risk assessment methods have been employed to evaluate and defend the safety of food ingredients, pharmaceuticals, pesticides, household products, and industrial chemicals. Most recently, the benchmark dose (BMD) approach has gained recognition as an advanced tool for risk assessment by competent international authorities including the U.S. Environmental Protection Agency (USEPA), The National Institute for Public Health and the Environment of the Netherlands (RIVM), and the Scientific Committee of the European Food Safety Authority (EFSA).

The BMD method was developed as an alternative to the No-Observed-Adverse-Effect-Level (NOAEL) approach for determining the "point of departure" (POD) for chemical risk assessment. The BMD corresponds to the dose at which a 10 percent change in response for a toxicological effect (or 5 percent change for developmental/reproductive effects) occurs. The USEPA uses the BMD approach for estimating reference doses (RfDs) and reference concentrations (RfCs) for non-cancer human health effects. The BMD approach is also used to test the fit of different mathematical models to cancer data sets and to determine the slope factor (cancer potency factor) in the low-dose region. The BMD approach is useful for defining a POD for a risk assessment when a clear NOAEL cannot be defined from the available studies. Using the BMD approach, toXcel specialists can test the "fit" of up to 30 different mathematical models to dose-response data sets. The BMD analysis can estimate the 95th percentile lower bound on the benchmark dose, known as the BMDL, which then becomes the POD for the risk assessment.

Gary Whitmyre of toXcel is experienced in the use of the Benchmark Dose Modeling systems (including the USEPA's BMDS and RIVM's PROAST in the EU).

toXcel can:

- Identify appropriate toxicological data sets as the starting point for using the BMD software;
- Test mathematical models and data sets in the USEPA's BMD software;
- Evaluate model fit and select the most appropriate model to develop the BMD and BMDL; and
- Interact with the regulatory authorities on troubleshooting and model refinement issues.

Feel free to contact us to discuss the many ways that our staff scientists can help you and your company refine your product safety risk assessments.

For further information, contact Gary Whitmyre at (703) 754-0248, extension 113, or by email at gary.whitmyre@toxcel.com.


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